PROJECT NUMBER: 1758
PROJECT TITLE: Tobacco Cell Wall Research
PROJECT LEADER: G. H. Bokelman
PERIOD COVERED: July, 1987

I. COMPOSITION OF DUST SAMPLES FROM THE CABARRUS PRIMARY (G. Bokelman and J. Stimler)

A. **Objective**: Determine whether one or more components in the cigarette blend make disproportionately large contributions to the total amount of dust generated at the Primary in Cabarrus.

B. **Results**: Using control blends, multiple linear regression analysis revealed that an accurate mathematical model for predicting the tobacco composition of these dust samples required only four predictor (or independent) variables: calcium, aspartic acid, β-methylvaleric acid (ratio of sample to standard) and cellulose index.

C. **Conclusions**: It was found that there was a significant, but highly variable, content of sand in every dust sample. Comparison of the predicted compositions of the dust samples with the ratios of the cigarette blend components actually processed at the Cabarrus Primary led to a number of findings: (1) there is a relationship between collection site and composition of dust sample, (2) Oriental leaf appears to be the most friable of all the tobacco components, (3) bright lamina and burley lamina are the least friable tobacco components, and (4) stem, which is a major component of RL, has intermediate friability.

In summary, there were two major conclusions: (1) Oriental leaf is the only tobacco component which has a disproportionately great tendency to form dust and (2) sand is prevalent in all the dust samples.

D. **Plans**: Analyses also will be run on another set of dust samples that has been requested from the Cabarrus Primary. In collaboration with Mary Ellen Counts, a friability study will be run on DBC bright, DBC burley and MT uncased filler to see if supporting data can be obtained regarding the tendency of Oriental leaf to form dust. In addition, silicon analyses will be performed on a number of tobacco components in an effort to determine the source of the sand in the Primary.

II. GEL PERMEATION CHROMATOGRAPHY OF DEGRADED CITRUS PECTIN (S. Baldwin)

A. **Objective**: Determine the molecular weight distribution of one or more samples of degraded citrus pectin being considered for use as a foamed binder.

B. **Background**: All methods for determining the molecular weights of polymers give averaged values. For example, the degraded citrus pectin samples presently being considered for use in the foamed

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binder program have molecular weights ranging from ~3,000 to ~5,000 daltons as determined by intrinsic viscosity. It is not known whether these samples are homogeneous or have polymodal distributions, the individual components of which might have different properties.

C. **Results**: A variety of dextran molecular weight reference standards, some of which had to be custom ordered, have been obtained. Appropriate gels also have been ordered for the medium-pressure chromatographic system, which will be coupled to a refractive index detector.

D. **Plans**: One or more of the most promising degraded citrus pectin samples will be fractionated by medium-pressure gel permeation chromatography. The resultant fractions first will be submitted for fast atom bombardment mass spectrometry to determine exact molecular weights. Subsequently, as time permits, these same fractions will be characterized by the methylation analysis procedures to determine monomeric linkage patterns. If more than one significant component is found in a degraded citrus pectin sample, an effort will be made to obtain sufficient quantities in order to make a preliminary evaluation of the physical properties of the respective fractions.

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